



User's Manual

CPSPV5000ETL

CPSPV4000ETL

CyberPower Systems Inc.

www.cpswww.com

IMPORTANT SAFETY INSTRUCTIONS

Save These Instructions! This manual contains important constructions that shall be followed during the installation and maintenance of the CyberPower Grid Tie Solar Inverter.

CAUTION! Before installation and using the Inverter, read all instructions and cautionary markings on the inverter and appropriate sections of this guide.

CAUTION! To reduce risk of fire hazard, do not cover or obstruct the heat sink.

CAUTION! Observe the clearance recommendations. Do not install the Inverter in a zero-clearance or non-ventilated compartment. Overheating may result.

CAUTION! Use only accessories recommended or sold by the manufacturer. Doing otherwise may result in a risk of fire, electric shock, or injury to persons.

CAUTION! To avoid a risk of fire and electric shock, make sure that existing wiring is in good condition and that wire is not undersized. Do not operate the Inverter with damaged or substandard wiring.

CAUTION! Do not operate the Inverter if it has received a sharp blow, been dropped, or otherwise damaged in any way.

CAUTION! Do not disassemble the Inverter. It contains no user-serviceable parts. Attempting to service the Inverter yourself may result in a risk of electrical shock or fire and will void the factory warranty.

CAUTION! To reduce the risk of electrical shock, disconnect both AC and DC power from the Inverter before attempting any, maintenance or cleaning or working on any circuits connected to the inverter. Turning off controls will not reduce this risk. Internal capacitors remain charged for 5 minutes after disconnecting all source of power.

CAUTION! The Inverter must be connected to an equipment-grounding conductor directly or via the AC ground.

ATTENTION: Risk of burning: During operation the case temperature may exceed 140°F (60°C), do not touch.

HIGH VOLTAGE: Before opening the device, disconnect from the grid and the PV generator. The device may only be opened by an electrician.

The following conventions are used in this guide.



WARNING! Warnings identify conditions that could result in personal injury or loss of life.



CAUTION! Cautions identify conditions or practices that could result in damage to the unit or other equipment.

IMPORTANT: These notes describe things which are important for you to know, but not as serious as a caution or warning.

About This Manual

This purpose of this Installation & Operation Manual is to provide explanations and procedures for installing, operating, maintaining, and troubleshooting the CyberPower Grid Tie Solar Inverter.

Scope

This manual provides safety guidelines, detailed planning and setup information. It provides procedures for installing the inverter and information about operating and troubleshooting the unit. It does not provide details about particular brands of photovoltaic (PV) panels. You need to consult individual PV manufacturers for this information.

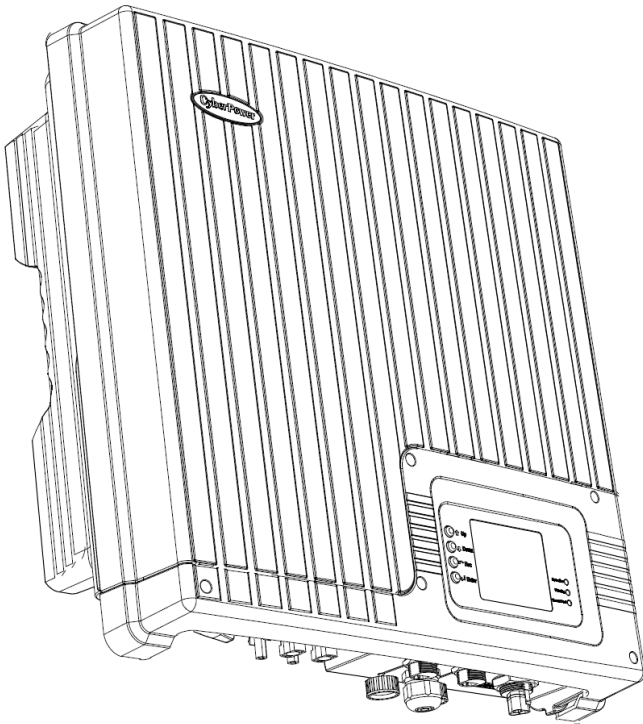
Audience

This manual is intended for anyone who needs to install and operate the inverter. Installers should be fully educated on the hazards of installing electrical equipment. Certified electricians or technicians are recommended.

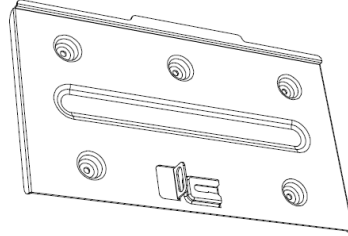
Abbreviation and Acronyms

AC:	Alternating Current
DC:	Direct Current
LCD:	Liquid Crystal Display
LED:	Light Emitting Diode
MPPT:	Maximum Power Point Tracking
PC:	Personal Computer
PV:	Photovoltaic
PWM:	Pulse Width Modulation
Vac:	Volts AC
Vdc:	Volts DC
V_{MP}:	Voltage at Maximum power
V_{oc}:	Open Circuit Voltage

UNPACKING



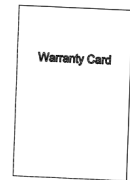
1) CPSPV5000ETL or CPSPV4000ETL module



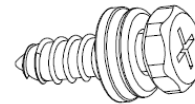
2) Stainless wall mount bracket



3) User's manual



4) Warranty card



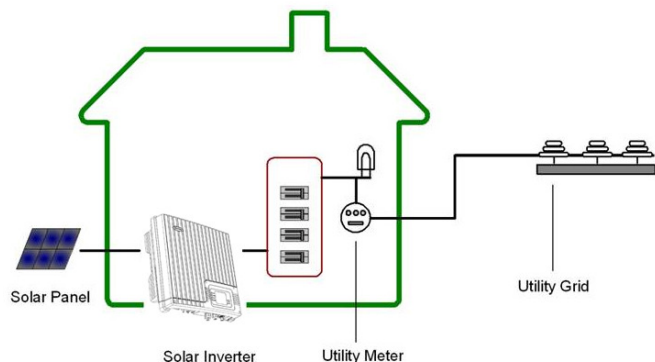
5) Self-tapping screws: M6*30L(5)

Installation

CyberPower Grid Tie Solar Inverter

The CyberPower Grid Tie Solar Inverter is designed to convert solar electric (photovoltaic or PV) power into utility-grade electricity that can be used by the home or sold to the local power company.

Installing the inverter consists of mounting it to the wall and connecting the DC input to a PV array and the AC output to the utility. See below figure for a simple diagram of a typical installation.



In order to operate, the inverter must have grid power available and connected. It will not provide backup power if the AC grid fails.

Installation Options

The inverter may be installed as a single inverter, or in a multiple inverter configuration.

For CPSPV5000ETL / CPSPV4000 ETL, only one PV array can be connected to the inverter.

Single Inverter Installation

In this configuration, a single inverter collects the harvested solar energy and route the power to the main utility service panel to be used by the loads. Any surplus power not used by the loads will be directed to the utility grid.

Multiple Inverter Installation

If multiple inverters are used, each inverter must be wired to an independent PV array. In this configuration, each inverter collects the harvested solar energy from a separate PV array and routes the power to the main utility service panel to be used by the loads. Any surplus power not used by the loads will be directed to the utility grid.

Planning the Installation

The following issues need to be considered when planning for an installation using the inverter. See the specified sections for more information.

- **Inverter Location?**
- **PV Array Requirements?**
- **Grounding Requirements?**
- **Routing the wires?**

Ensure that you have obtained all permits required by local authorities or utilities before commencing installation.

Inverter Location



WARNING! Burn hazard

Do not install in a location where people can accidentally come into contact with the inverter. High temperatures can be present on the inverter, causing a potential burn hazard.

In extreme condition, the inverter chassis can reach temperatures over 70°C (158°F), which can cause skin burns if accidentally touched. Ensure that the inverter is located away from normal traffic areas.

Inverter failure due to improper installation will void the inverter warranty. Consider the following when determining where to install the inverter.

Fire Safety

Do not install anywhere near combustible or flammable materials.

Indoor/Outdoor

The inverter uses a Type IP65-rated enclosure that can be mounted indoors or outdoors.

Orientation

The inverter must be mounted vertically on a wall or pole. Do not mount the inverter horizontally.

Temperature

Ensure that the inverter is mounted in a location where the ambient temperature range is -20°C to +60°C. When the temperature is over +40°C, the inverter may de-rate power.

Ground Clearance

Outdoors, the inverter requires at least 50 cm (19.7 inches) of clearance between the bottom of the unit and the ground.

Indoors, it is recommended that the same clearance between the bottom of the unit and the floor be used.

Distance

To minimize copper losses, ensure that wire lengths between the PV array and the inverter and between the inverter and the Main Utility Service Panel are kept to a minimum.

The maximum distances will depend on wire gauges and PV array output voltages

Debris free

Excessive debris (such as dust, leaves, and cobwebs) can accumulate on the unit, interfering with wiring connections and ventilation. Do not install in a location where debris can accumulate (under a tree, for example).

Installation

PV Array Requirement



WARNING! Shock hazard

Whenever a PV array is exposed to sunlight, a shock hazard exists at the output wires or exposed terminals. To reduce the risk of shock during installation, cover the array with an opaque (dark) material before making any connections.

IMPORTANT:

The PV array should be free of shade. This requirement includes even small obstructions such as vent pipes, chimneys and power lines. A small amount of shade can have a disproportionately high impact on system performance.

General Recommendations

It is important that the PV array is installed correctly to the manufacturer specifications and to local code requirement.

Equipment and Installation Recommendation

Equipment recommendations

- All electric equipment should be listed for the voltage and current ratings necessary for the application.
- All wiring should be sized correctly to minimize voltage drop.
- All required over-current protections should be include the system and accessible for maintenance.
- Integral roofing products should be properly rated.

Installation recommendations

- All electrical terminations should be fully tightened, secured, and strain relieved as appropriate.
- All mounting equipment should be installed according to the manufacturer specifications.
- All roof penetrations should be sealed with an acceptable sealing method that does not adversely impact the roof warranty.
- All wires, conduit, exposed conductors and electrical boxes should be secured and supported according to code requirements.

PV Voltage and MPPT Requirement

MPPT operational window

The MPPT software maximizes the output energy of solar arrays as long as the operating voltage is within the operational window. Ensure that the PV array used in the system operates within the MPPT operational window. Effects of array voltages outside of the MPPT operational window are shown in below Table.

Voltage (Vdc)	Effect of Array Voltage	Inverter Mode
<250	Will shut down	Shutdown
250~310	Maximum harvest of solar energy. (limit input max current 17A)	MPPT window
310~750	Maximum harvest of solar energy.	MPPT window
750~900	Maximum harvest of solar energy. (limit input max power)	MPPT window
>900	Will shut down and may cause damage to the inverter.	Shutdown

PV Voltage requirements

The maximum power point voltage of a string connect to the inverter should be a minimum of 320Vdc. If it is less than 320Vdc, the inverter will continue to operate, but it will regulate the PV voltage to 320Vdc. Because the array will not be operating at its maximum power point, this may result in lower than expected energy harvest.

Maximum PV Power

The solar array should be sized such that the maximum power output dose not exceeds the limit of the MPPT operation window. The array voltage should never exceed 900 VOC (open circuit voltage) under any thermal condition. Likewise, ensure that ISC (short circuit current) rating of the array at any temperature does not exceed the short circuit current of the inverter.

Guideline for Matching PV Array Size to Solar Inverter Input

For determining the number of panels required in the PV string (panels connected in series), you must ensure that the following requirements are met:

1. To avoid damage to the inverter, ensure that PV array output will never exceed 900Vdc under any conditions.
2. Do not exceed the maximum array short circuit current rating marked on the inverter.
3. To achieve maximum energy harvest from your array, ensure that the V_{MP} (voltage at maximum power) dose not drop below 310Vdc under most condition.

	CPSPV5000ETL	CPSPV4000ETL
MPPT tracker	1	1
Input current limitation	17A	13.5A
Max. Input short circuit current	20A	15A
MPPT start voltage (Vdc)	320	320
MPPT window (Vdc)	250~900	250~900
Inverter full load range (Vdc)	310~750	310~750
Inverter de-rating range (Vdc)	250~310	250~310
Maximum input voltage (Vdc)	900	900

Installation

Grounding Requirements



WARNING! Shock hazard

The inverter must be grounded by connection to a grounded permanent wiring system.

AC grounding

The inverter must be connected to a grounded, permanent wiring system via the inverter ground terminal.

The ground terminal must also be connected to the main utility breaker panel ground bar and to the house-grounding rod according to requirement.

Lightning protection

Reduce the risk of lightning damage by using a single-point grounding system. In this system, all ground lines terminate at the same point. This point normally is the main utility ground installed by the utility company to provide a ground for the house wiring. This ground usually consists of a copper rod driven 1.5 to 2.5 meters (6 to 8 feet) into the earth.

Routing the wires

Preparing for the Installation

Ensure your local utility is consulted for any requirements for connecting to or returning power to the grid. Obtain all permits necessary to complete the installation. Consult your local and national electrical codes for more information.

This section includes the following topic:

1. Wiring

- The wires to AC terminal:

Acceptable wire size:

For CPSPV5000ETL: From #10 AWG (4mm² to 6mm²).

For CPSPV4000ETL: From #12 AWG to #10 AWG (3mm² to 6mm²).

- The wires to DC connectors:

Recommended Type:

For PV (+): PV-KBT4/2,5I with 1.5~2.5mm² cable (double-isolation)

For PV (-): PV-KST4/2,5I with 1.5~2.5mm² cable (double-isolation)

IMPORTANT:

Wiring should be not undersized. Undersized wiring can result in significant power losses and reduction in system efficiency.

2. AC Circuit breaker

This breaker must be sized to handle the rated maximum output voltage and current of the inverter. (Please refer to the inverter specification)

Recommended AC Circuit Breaker:

For CPSPV5000ETL: 32 Amps / 250 Vac.

For CPSPV4000ETL: 25 Amps / 250 Vac.

Mounting the inverter



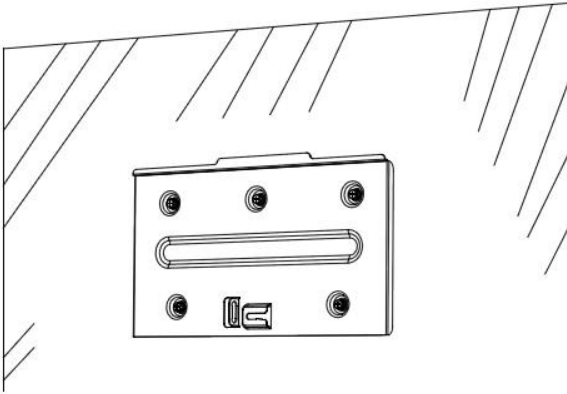
WARNING! Fire, Shock and Energy Hazard

Before installing the inverter, read all instructions and cautionary markings located in this manual, on the PV array, and on the main service panel.

Mount the inverter

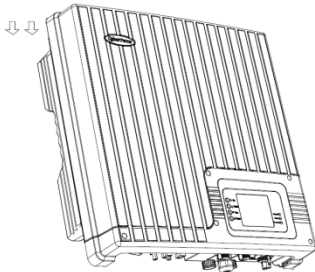
Make sure the supporting surface is strong enough to handle 75 kg (160lb) for the inverter.

Step1: Fix the wall mount bracket

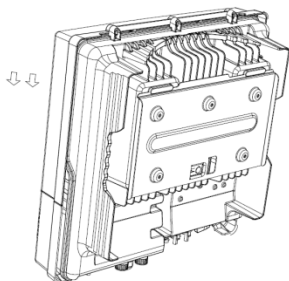


Use the attached screws / Self-tapping screws: M6*20L (5pcs)

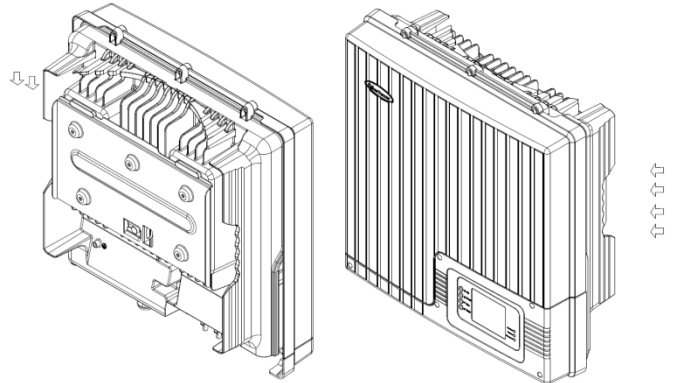
Step2: Put the inverter on the wall mount bracket



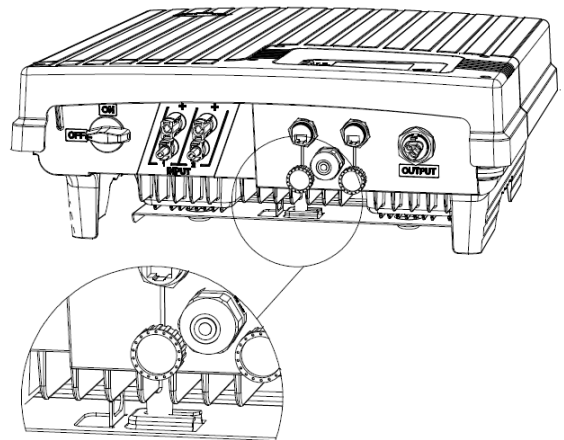
Step3: Make sure the host of inverter on the incision of the wall mount bracket



Step4: Move the inverter from right to left side, and make sure the hole is locked with wall mount bracket.



Step5: Use cable ties, and fix the inverter with wall mount bracket.



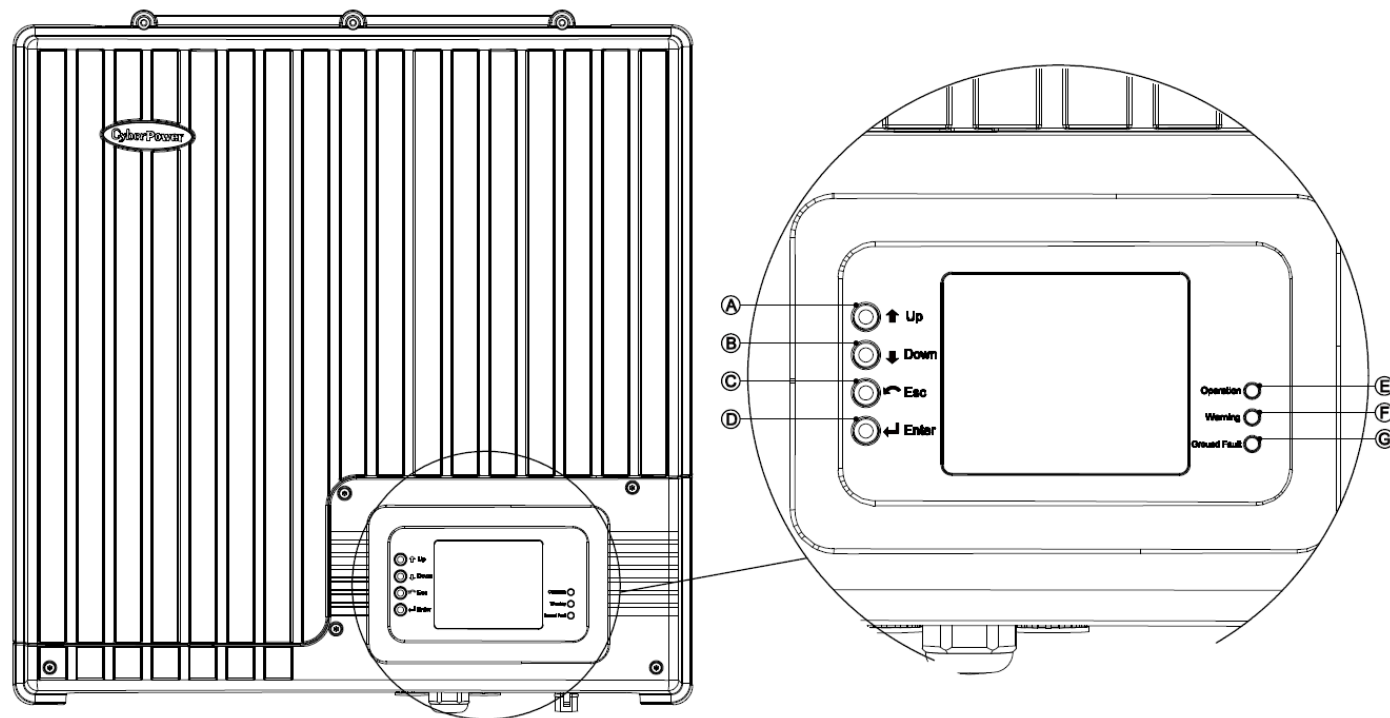
WARNING! Equipment damage Shock hazard

If your installation location requires that you drill additional conduit holes into the bracket, ensure that there are no metal shavings left inside the unit. These could cause a short circuit when unit is operating.

Standard Feature

- Sealed inverter section protecting power electronic components (IP65)
- Liquid Crystal Display providing easy-to-read system status and daily cumulative energy production information
- Three LED indicator lights providing status, ground fault and other warning indication

Front Panel Feature



1. LCD:

Graphic liquid crystal display / "160*128" dots

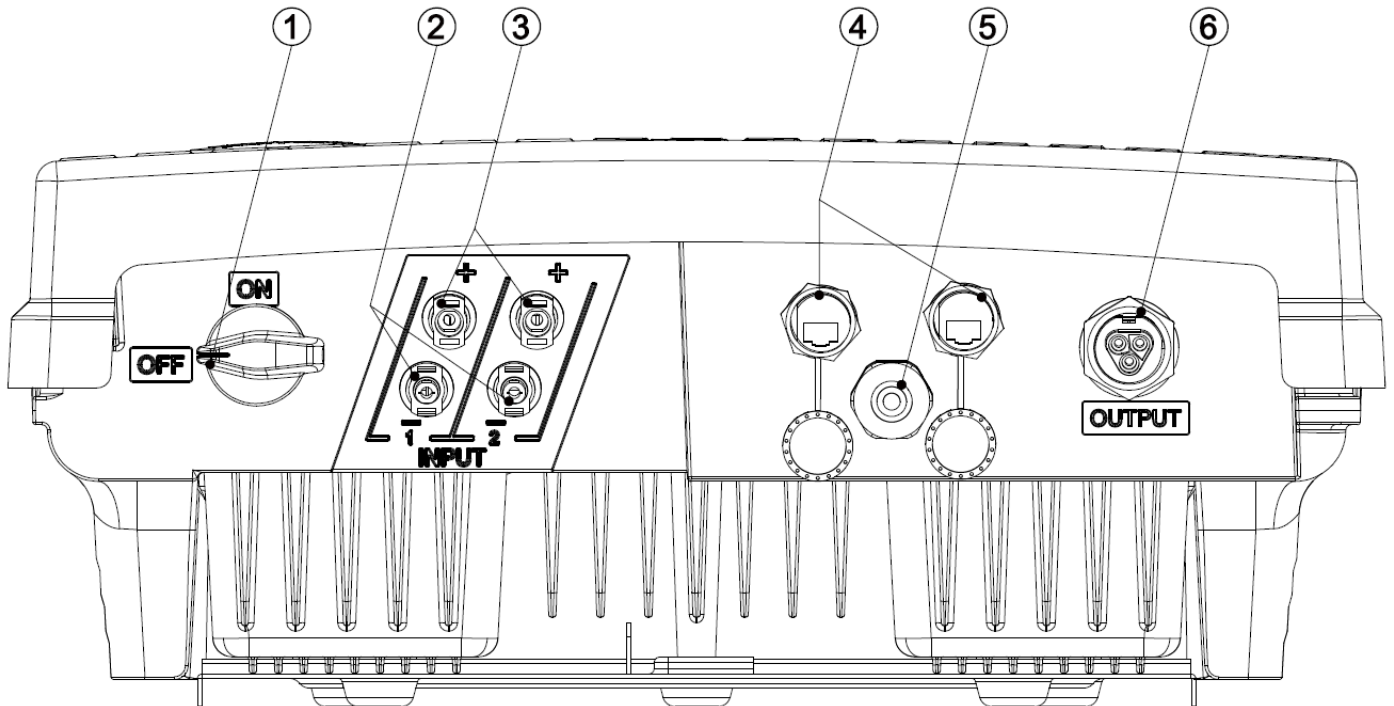
2. Button:

- (A): Up key: select the display item
- (B): Down key: select the display item
- (C): Esc key: escape to upper level
- (D): Enter key: enter into next level

3. LED:

- (E): LED Indicator Light (Green) – Flash: Standby for reconnection / Solid: Operation
- (F): LED Indicator Light (Red) – Warning condition
- (G): LED Indicator Light (Yellow) – Ground fault

Rear Panel Feature



- ①: DC switch: The device which can disconnect the solar input
- ②: Solar input (- / negative): DC wires connect to solar array negative
- Recommended type: PV-KST4/2,5l with 1.5~2.5mm² cable (double-isolation)
- ③: Solar input (+ / positive): DC wires connect to solar array positive
- Recommended type: PV-KBT4/2,5l with 1.5~2.5mm² cable (double-isolation)
- ④: M20*1.5 cable glands * 2pcs: For RS-485 communication
- ⑤: M20*1.5 cable gland * 1pcs: For RM card communication
- ⑥: AC connector (male): Connect to the utility output
- Recommended female type: 96.0314154.3 (Wieland)

Startup Procedure

Check the PV Array DC Voltage

1. Uncover the PV arrays and expose them to full sunlight. The sunlight must be intense enough to produce the required output voltage.
2. Measure the PV array open circuit DC voltage across the DC positive (+) and negative (-) terminals. This voltage must be greater than 320 volts DC (to energize the electronics) and less than 900 volts DC (to prevent damage to the inverter).

Check the AC Utility Voltage

1. Switch on the main and inverter breakers in the main electrical service panel.
2. Using an AC voltmeter, measure the AC open circuit utility voltage between L (L1) and N (L2). Ensure the voltage is at approximately the nominal value. The inverter operates with the voltage range around the nominal value.

See "Electrical Specification", output section for the utility voltage operating range for your inverter model.

Start up the Inverter

1. Switch the DC and AC disconnection switches (breakers) to the ON position.
2. Check the inverter LCD. The startup screens should appear for several seconds, and then the "Countdown xx:xx" special screen will appear until protection timer countdown is completed.

Disconnect Test

The disconnect test is designed to verify correct operation of the inverter both on initial operation and periodically through its life as required by the utilities. This test ensures that the inverter does not send electricity to the utility grid when local utility has shut off the grid for repairs, or when the utility wiring is damaged.

To run the disconnect test

1. Switch off the AC circuit for the inverter
This can be accomplished by switching the breaker on the main panel that feeds the inverter(s). The disconnection for the home or business may be used as well.
2. Have someone watch the front panel of the inverter to ensure the green light on the front of the inverter goes out.
The green light goes out when AC circuit is switched off, disconnecting the inverter from the AC grid. The front panel display will show an AC voltage and frequency fault display, indicating that the AC is out of the operating range.
3. Switch on the AC circuit for the inverter
The inverter responds by starting its reconnecting protection timer. Ensure that the inverter does not produce power before the countdown is over. After completing the countdown, the green light turns on and the inverter begins to send power to the grid. The display returns to show the power being produced and total kWh produced to date.

IMPORTANT:

The default voltage, frequency and reconnect delay values are programmed into the unit at time of shipment from the factory. No changes to these settings can be made in the field by the user. Only authorized personnel with utility permission may change these settings.

Monitoring the Inverter

After installation, at the first startup, the following setting should be set through the display.

■ Select code

VDE-AR-N4105
VDE0126-1-1
VDE0126-1-1/UTE
VDE0126-1-1/TW
Select Code

■ Select language

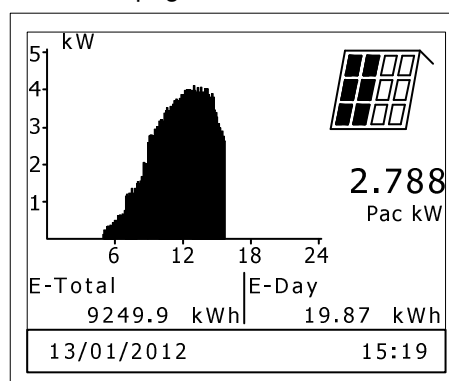
English
French
German
Italian
Spanish
Select Language

■ Select date & time

Set Date	12/01/2012
Date View	dd/mm/yyyy
Set Time	14:59
Time View	24
Exit	
Date & Time	

After you select above three items, the display will enter into "Home Page"

1. Home page



Pac kW: Right now the inverter provides how much power to the grid.

E-Total: From the installation to now, the inverter provided how much energy to the grid.

E-day: Today the inverter provided how much energy to the grid.

➔ Press "Enter" key

2. Main menu:

		1 / 2
Energy Totals	Data Logger	
		2 / 2
Multi Meter	Log Book	
Main Menu		

	2 / 2
Config	
Main Menu	

Monitoring the Inverter

➔ In "Main Menu", select Energy total, then press "Enter" key

2.1 Energy Totals:

Input	9249.9	kWh
Total	9249.9	kWh
CO2	5013.4	Kg
Savings	3903.4	EUR

Energy Totals

➔ In "Main Menu", select Data Logger, then press "Enter" key

2.3 Data Logger:

Daily Log
Monthly Log
Yearly Log

Data Logger

➔ In "Main Menu", select Multi meter, then press "Enter" key

2.2 Multi meter:

Input			
Pdc	3088.1	W	1
Vdc	530.0	V	/
Idc	5.8	A	2

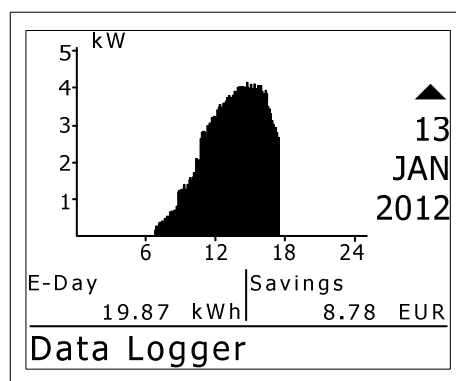
Multimeter

Output			
Pac	2988.1	W	1
Vac	230.1	V	/
Iac	12.9	A	2
Fac	50.1	Hz	

Multimeter

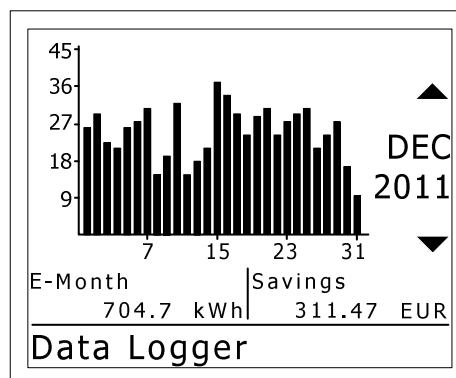
➔ In "Data Logger", select Daily Log, then press "Enter" key

2.3.1 Daily Log:



➔ In "Data Logger", select Monthly Log, then press "Enter" key

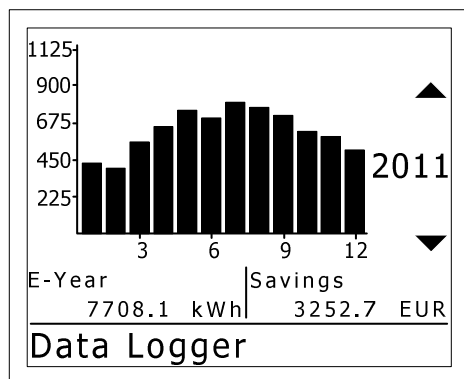
2.3.2 Monthly Log:



Monitoring the Inverter

➔ In "Data Logger", select Yearly Log, then press "Enter" key

2.3.3 Yearly Log:



➔ In "Main Menu", select Log Book, then press "Enter" key

2.4 Log Book:

Event Log		
11/01/2012	19:34	1 / 2
Solar 1 Low		
04/01/2012	11:09	2
No Grid		
04/01/2012	11:05	
Grid Quality		
25/11/2011	08:12	
AC Volt Low		

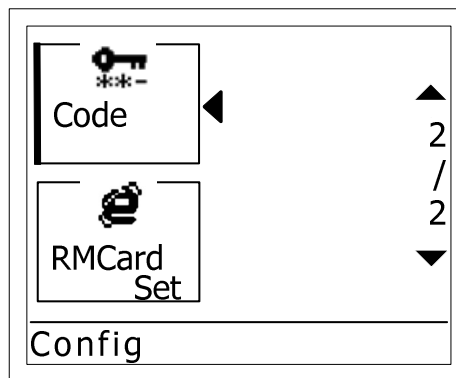
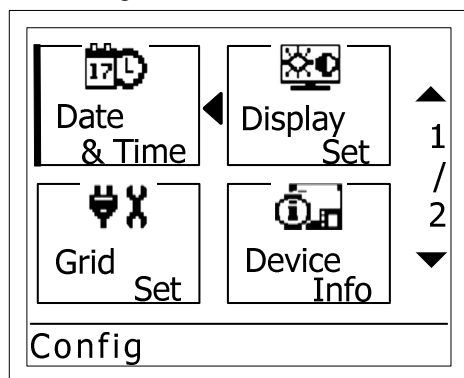
Log Book

IMPORTANT:

There are over last 100 dated failure reports on the NS protection can be read.

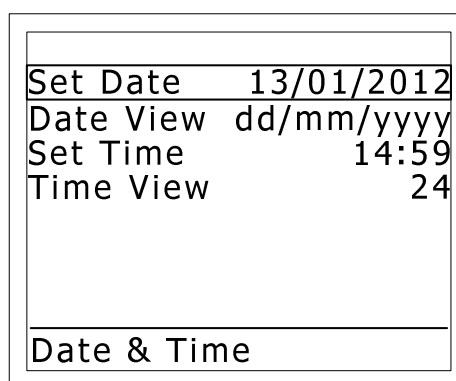
➔ In "Main Menu", select Config, then press "Enter" key

2.5 Config:



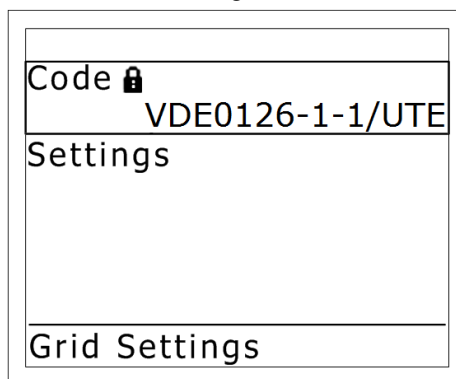
➔ In "Config", select Date & Time, then press "Enter" key

2.5.1 Date & Time:



➔ In "Config", select Grid Set, then press "Enter" key

2.5.2 Grid Settings:



IMPORTANT:

The settings only can be used by authorized personnel with utility permission.

Monitoring the Inverter

➔ In "Config", select Display Set, then press "Enter" key

2.5.3 Display Settings:

Brightness	5
Contrast	4
Language	English
Currency	EUR
Value/kWh	0.422
Sleep Mode	OFF
Demo Mode	OFF
Display Settings	

RS485ID	001	▲
		3
		/
		3
Device Info		

➔ In "Config", select Device Info, then press "Enter" key

2.5.4 Device Info:

Model	ETL05K1P
SN	CPL05K010001
Manufacturer	Cyberpower
Setup Date	23/12/2010
Device Info	

Runtime(Hour)	3	▲
Firmware(C)	V00.25	2
Firmware(M)	V00.17	/
Firmware(R)	V00.51	3
Device Info		

➔ In "Config", select Installer Code, then press "Enter" key

2.5.5 Installer Code:

0	0	0	0
Enter			
Installer Code			

IMPORTANT:

The settings only can be used by authorized personnel with utility permission.

➔ In "Config", select RMCARD Set, then press "Enter" key

2.5.6 RMCARD Settings:

Reset Card	-----
TCP/IP Status	
RMCARD Settings	

IMPORTANT:

The settings only can be used by authorized personnel with utility permission.

Warning / Error / Fault List Table

Warning table

W00	Solar input voltage low
W04	Solar input voltage high

Error table:

E00	No Grid
E01	AC frequency high (According to code setting table)
E02	AC frequency low (According to code setting table)
E03	AC voltage high (According to code setting table)
E04	AC voltage low (According to code setting table)

Fault table

(Usually you need to call service people if there is always fault condition happened)

F01	Hardware DC injection of output current (According to code setting table)
F05	Temperature sensor 1 low
F06	Temperature sensor 1 high
F07	Hardware temperature sensor 1 failure
F08	Temperature sensor 2 high
F09	Hardware temperature sensor 2 failure
F10	Temperature sensor 3 high
F11	Hardware temperature sensor 3

	failure
F15	Hardware main DSP ADC1 failure
F16	Hardware main DSP ADC2 failure
F17	Hardware main DSP ADC3 failure
F18	Hardware main DSP ADC4 failure
F19	Hardware redundant MCU ADC1 failure
F20	Hardware efficiency failure
F22	Hardware communication 1 failure
F23	Hardware communication 2 failure
F24	Residual current failure (According to code setting table)
F25	Hardware RCMU failure
F26	Input insulation failure
F28	Hardware relay short
F29	Hardware relay open
F31	Hardware DC Bus 1 OVP
F33	Hardware DC Bus 2 OVP
F36	AC output current high (fast)
F37	AC output current high (slow)
F42	Hardware CT failure
F45	Hardware AC current OCP
F60	DC input current high (slow)
F70	DC input current high (fast)

TECHNICAL SPECIFICATIONS

Model	CPSPV4000ETL		CPSPV5000ETL
Feature			
	Type of equipment	Grid tied PV inverter	
		Non-isolated (transformer-less)	
		Adjustable reactive power	
		Outdoor enclosure (IP65)	
Input			
	Absolute maximum PV input voltage	900 Vdc	
	Operation voltage range	250 ~ 900 Vdc	
	MPP voltage range @nominal power	310 ~ 750 Vdc	
	Input power capture	>99%	
	Rating input voltage	650 Vdc	
	Inverter wake up voltage	< 200 Vdc (DC power supply on)	
	Start voltage	320 Vdc	
	MPPT tracker	1 tracker	
	Input current limitation	13.5 Adc	17 Adc
	Max backfeed current	0 A	
	Maximum efficiency@650Vdc	97.6%	97.8%
	European efficiency@650Vdc	97.0%	97.3%
	Input protection	Voltage and current limitation Array impedance measurement Residual current measurement	
	Input detection tolerance	Input voltage deviation < 2% Input current deviation <3% Input power deviation <3%	
Output			
	Output rating power	4000 Watt	5000 Watt (For VDE-AR-N 4105: 4600 Watt)
	Grid	Single phase	
	Grid rating voltage	230 Vac	
	Grid voltage range (Over / under voltage disconnect)	180 ~ 270 Vac (According to code setting table)	
	Over / under voltage disconnect time	According to code setting table	
	Grid rating current	17.4 A	21.7 A (20 A Germany)
	Grid maximum continuous current	20 A	24 A
	Grid rating frequency	50 / 60 Hz	
	Grid maximum inrush current	<150 A	
	Maximum output fault current	>30A	
	Maximum output overcurrent protection	40 A	50 A
	Grid frequency range (Over / under frequency disconnect)	50 / 60 +/- 5 Hz (According to code table setting)	
	Over / under frequency disconnect time	According to code setting table	
	Active islanding method	Yes	
	Reconnect time (After grid recover)	According to code setting table	
	Output current DC component	According to code setting table	
	Output current harmonic distortion	< 5%	
	Adjustable reactive power range	0.8 inductive ~0.8 capacitive	
	Nighttime power consumption	< 1 Watt	
	Output protection	Output AC fuse Current limitation and thermal de-rating Over temperature protection	
	Output detection tolerance	Utility voltage deviation < 1%	

TECHNICAL SPECIFICATIONS

		Utility frequency deviation < 0.05Hz Output current deviation < 3% Output power deviation < 3% Countdown timer deviation <1 sec
	Power limitation	Temperature sensor on heat-sink & internal air temperature Output voltage under 195 Vac
Information		
	Communication	RS485 / Ethernet (optional) / WiFi (optional)
	LED	Green / Red / Yellow
	LCD display	160 * 128 dots
	Control switches	Up / Down / Esc / Enter
	Display data	Real-time output power Inverter status Accumulate today output energy Accumulate lifetime output energy Event message Utility voltage, frequency PV voltage, power Firmware revision Inverter ID
	RTC (Real time counter)	10 years life
	Data storage	Accumulate historical energy
Regulatory		
	Safety	IEC 62109-1/2
	Grid interface	VDE-AR-N 4105 / VDE0126-1-1 A1/ UTE C 15-712-1
	Emission	EN 55022:2006
	Harmonic current emissions	EN 61000-3-12:2005
	Voltage fluctuations and flicker	EN 61000-3-11:2001
	Immunity	EN 55024
Operation Environment		
	Operating Temperature	-20°C to 60°C (full power -20°C to 40°C)
	Storage temperature	-20°C to 60°C
	Relative humidity	4% ~ 100%
	Audible noise	<36dB
	Operating elevation	0 ~ 2000 m (0 ~ 6666 ft)
	Vibration / Drop	ISTA_1A standard
Physical		
	Dimensions (unit)	L x W x H = 487 x 497 x 191mm
	Dimensions (Package)	L x W x H = 615 x 615 x 380 mm
	Net Weight	26 Kg
	Gross Weight	30.5 Kg
	Enclosure rating	IP 65
	Installation type	Wall mount
	DC connector	2 pairs of Multi Contact connectors
	AC connector	Waterproof AC connector

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TECHNICAL SPECIFICATIONS

Explanation of symbols



Beware of dangerous electrical voltage.



1 minutes

Energy storage timed discharge with 1 minutes.



Beware of hot surface.



Observe enclosed documentation.



There are special requirements.



The inverter complies with the requirements of the applicable EC guidelines.



The inverter must not be disposed of together with the household waste.

Code setting table

Code table number	2		3		4		5	
Code	VDE-AR-N4105		VDE0126-1-1		UTE C15-712-1		VDE0126-1-1/TW	
	Default							
	Setting	Trip time	Setting	Trip time	Setting	Trip time	Setting	Trip time
Start up time	60	--	30	--	30	--	30	--
Reconnect time (T < 3S)	60	--	5	--	5	--	300	--
Reconnect time (normal)	60	--	30	--	30	--	300	--
Voltage high OFF (Fast)	264.5	0.08 sec	264.5	0.2 sec	255.3	0.2 sec	242	0.2 sec
Voltage high ON (Fast)	250.7	--	259.5	--	251.3	--	237	--
Voltage low OFF (Fast)	184.0	0.08 sec	184	0.2 sec	184	0.2 sec	187	0.2 sec
Voltage low ON (Fast)	197.8	--	189	--	189	--	192	--
Frequency high OFF (Hz)	51.50	0.08 sec	50.2	0.2 sec	50.2	0.2 sec	60.3	0.2 sec
Frequency high ON (Hz)	50.05	--	50.15	--	50.15	--	60.1	--
Frequency low OFF (Hz)	47.50	0.08 sec	47.5	0.2 sec	46	0.2 sec	59.7	0.2 sec
Frequency low ON (Hz)	47.55	--	47.55	--	46.1	--	59.9	--
Voltage high OFF (Slow)	253.0	600 sec	253	600 sec	253	600 sec	--	--
Voltage high ON (Slow)	250.0	--	250	--	250	--	--	--
Voltage low OFF (Slow)	--	--	--	--	--	--	--	--
Voltage low ON (Slow)	--	--	--	--	--	--	--	--
DC Injection (mA)	--	--	1000	0.2 sec	1000	0.2 sec	0.45%	0.2 sec
Ground Current (mA)	300	0.3 sec	300	0.3 sec	300	0.3 sec	300	0.3 sec
Insulation	Yes	5 sec	Yes	5 sec	Yes	5 sec	Yes	5 sec
Islanding	Yes		Yes		Yes		Yes	
Islanding Factor	100		100		100		100	
Active Power	Yes		--		--		--	
Reactive Power	Yes		--		--		--	
Frequency de-rating	Yes		--		--		--	
Power slow-up	Yes		--		--		--	

Code setting table

Code table number	6		7		8			
Code	VDE0126-1-1/A1		IEC62116 MEA		IEC62116 PEA			
	Default							
	Setting	Trip time	Setting	Trip time	Setting	Trip time	Setting	Trip time
Start up time	30	--	120	--	60	--		--
Reconnect time (T < 3S)	5	--	120	--	20<t<300	--		--
Reconnect time (normal)	30	--	120	--	20<t<300	--		--
Voltage high OFF (Fast)	264.5	0.2 sec	241/311	2/0.05 sec	242/264	1/0.16 sec		
Voltage high ON (Fast)	259.5	--	240	--	237	--		
Voltage low OFF (Fast)	184	0.2 sec	199/114	2/0.1 sec	198/110	2/0.3 sec		
Voltage low ON (Fast)	189	--	200	--	203	--		
Frequency high OFF (Hz)	51.5	0.2 sec	51.1	0.1 sec	51.1	0.1 sec		
Frequency high ON (Hz)	50.5	--	51	--	51	--		
Frequency low OFF (Hz)	47.5	0.2 sec	48.9	0.1 sec	47.9	0.1 sec		
Frequency low ON (Hz)	47.55	--	49	--	48	--		
Voltage high OFF (Slow)	253	600 sec	--	--	--	--		
Voltage high ON (Slow)	250	--	--	--	--	--		
Voltage low OFF (Slow)	--	--	--	--	--	--		
Voltage low ON (Slow)	--	--	--	--	--	--		
DC Injection (mA)	1000	0.2 sec	1000	0.2 sec	1000	0.2 sec		
Ground Current (mA)	300	0.3 sec	300	0.3 sec	300	0.3 sec		
Insulation	Yes	5 sec	Yes	5 sec	Yes	5 sec		
Islanding	Yes		Yes		Yes			
Islanding Factor	100		100		100			
Active Power	--		--		Yes			
Reactive Power	--		--		Yes			
Frequency de-rating	Yes		--		--			
Power slow-up	Yes		--		--			

Reactive power measurement

